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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
DIVISION OF AGRICULTURAL ENGINEERING

S. H. McCrory, Chief

MONTHLY NEWS LETTER

WASHINGTON, D. C., FEBRUARY 20, 1930.

S. H. McCrory attended the meeting of the Southeastern Section of the American Society of Agricultural Engineers at Jackson, Miss. C. A. Bennett and Henry Giese also attended this meeting and Mr. Giese delivered an address on "Research in Farm Structures."

L. A. Jones will attend a meeting of the National Drainage Congress at St. Louis, Mo., from February 20 to 22 and deliver a paper on the subject of the maintenance of drainage channels. Before returning to Washington Mr. Jones will visit points in Louisiana, Texas, Oklahoma, Kansas and Missouri in connection with soil erosion and drainage investigations.

W. R. Humphries has left for a trip to Louisiana, Georgia, Mississippi, Arkansas and South Carolina in connection with the investigation of the utilization and cost of farm power in those States.

The headquarters of W. D. Ellison have been changed from Fort Wayne, Ind., to Bowling Green, Ohio. Mr. Ellison will conduct run-off investigations on several small streams in Northwestern Ohio.

J. G. Sutton delivered an address before the Drainage Section of the Illinois Society of Engineers at East St. Louis, Ill., on the subject "Factors Affecting the Cost of Pumping for Drainage".

F. O. Bartel has been detailed to survey selected farms in North Carolina as a part of the project relating to investigations of farm land development to be carried on in cooperation with the North Carolina Agricultural Experiment Station. It is expected that 12 to 15 farms will be surveyed, selected as representative of the different types of farming in that region. The North Carolina Station kept detailed records in 1929 of crops produced, feed used, cash receipts and expenditures and expects to continue the records for some years to come. The farms average about 100 acres each, 30 to 40 per cent in cultivation and the remainder in more or less worthless timber. The fields are small and irregular and not suited to efficient farm operations. G. R. Boyd is in general charge of this project.

On February 6, D. L. Yarnell presented a paper at a meeting of the Iowa Engineering Society at Council Bluffs, Iowa, on the subject "Flow over Highway and Railway Embankments".





J. T. BOWEN MADE A TRIP TO NEW YORK CITY RECENTLY IN CONNECTION WITH PROPOSED COOPERATIVE WORK WITH THE DAIRYMEN'S LEAGUE. THIS LEAGUE OPERATES ABOUT 230 MILK PLANTS IN THE MILK SHED OF NEW YORK CITY AND WISHES TO MAKE A SERIES OF TESTS PRIMARILY TO INCREASE THE EFFICIENCY OF THE HEAT DISTRIBUTION IN THE PROCESSES OF PASTEURIZING AND COOLING.

G. A. CUMINGS IS JOINT AUTHOR WITH A. L. MEHRING AND W. H. SACHS OF A REPORT ENTITLED "FIELD AND LABORATORY STUDIES OF FERTILIZER DISTRIBUTORS FOR COTTON".

M. C. BETTS REPORTS THE FOLLOWING SERVICE WORK: PLANS HAVE BEEN COMPLETED FOR A ZOOLOGICAL LABORATORY AT BELTSVILLE, MD. SPECIFICATIONS HAVE BEEN PREPARED FOR A SOIL STERILIZING OUTFIT FOR THE SUGAR PLANT INVESTIGATIONS AT ARLINGTON, VA. DRAWINGS ARE BEING PREPARED FOR AN IMPLEMENT SHED FOR THE ALASKA EXPERIMENT STATION AT SITKA.

W. W. McLAUGHLIN RETURNED TO BERKELEY THE MIDDLE OF JANUARY FROM WASHINGTON, D. C., AFTER STOPPING EN ROUTE TO INSPECT THE WORK IN TEXAS. ON JANUARY 27 HE ATTENDED A MEETING OF THE PACIFIC COAST SECTION OF THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS AT DAVIS, CALIF., AND SPENT THE LAST FEW DAYS OF THE MONTH IN SOUTHERN CALIFORNIA, LOOKING OVER THE PROJECT ON STORAGE OF WATER UNDERGROUND.

A. A. YOUNG DESCRIBES AS FOLLOWS THE PROJECT HE IS WORKING ON AT SANTA ANA, CALIF. A FEW YEARS AGO MUCH OF THIS DISTRICT HAD A HIGH WATER TABLE AND A LARGE UNCULTIVATED AREA, FREQUENTLY COVERED WITH SALT GRASS. EXTENSIVE DRAINAGE HAS GREATLY IMPROVED SOIL CONDITIONS, RESULTING IN AN INCREASED ACREAGE OF CITRUS, LIMA BEANS, AND CHILI PEPPERS. IN CONNECTION WITH THE SANTA ANA RIVER INVESTIGATIONS WHICH OUR DIVISION IS CONDUCTING, STUDIES ARE BEING MADE OF EVAPORATION AND TRANSPIRATION LOSSES FROM MOIST AREAS. ONE OF THE PURPOSES OF THIS WORK IS TO OBTAIN DATA FROM WHICH AN ESTIMATE MAY BE MADE OF THE EXTENT AND AMOUNT OF PREVENTABLE GROUND WATER LOSSES. RECORDS OF DEPTHS TO GROUND WATER OBTAINED BY MEANS OF TEST WELLS INDICATE THAT SURFACE WATER IS AT DEPTHS OF TWO TO TWELVE FEET, DEPENDING UPON THE AMOUNT OF IRRIGATION WATER APPLIED, SOIL TYPE, AND PRECIPITATION. DATA ON EVAPORATION AND TRANSPIRATION ARE BEING OBTAINED AT AN EXPERIMENTAL STATION NEAR SANTA ANA, USING WATER-JACKETED SOIL TANKS CONNECTED TO SUPPLY TANKS EQUIPPED WITH MARIOTTE CONTROL APPARATUS FOR MAINTAINING SOIL WATER LEVELS AT VARIOUS FIXED DEPTHS. THESE ARE OPERATED IN SETS OF THREE, SOME OF WHICH HAVE A SALT GRASS SOD WHILE OTHERS HAVE BARE UNCULTIVATED SURFACES. TANKS WERE JACKETED INTO THE GROUND IN ORDER THAT THE SOIL STRUCTURE MIGHT REMAIN UNDISTURBED. PRESENT RESULTS INDICATE THAT THE LIMITING DEPTH FOR EVAPORATION FROM UNCULTIVATED BARE SOILS OF A FINE SANDY LOAM TYPE IS ABOUT 3 1/2 FEET WITH A SOMEWHAT GREATER BUT AS YET UNDETERMINED DEPTH FOR SALT GRASS COVER. THE EVAPORATION FROM BARE SOILS HAVING A TWO-FOOT WATER TABLE AVERAGED 0.82 INCH FOR JULY AND 0.37 INCH FOR DECEMBER. EVAPORATION AND TRANSPIRATION LOSSES FROM SALT GRASS TANKS VARIED FROM 5.64 INCHES IN JULY TO 1.64 INCHES IN DECEMBER WITH THE WATER TABLE OF 2 FEET; AND 2.95 INCHES IN AUGUST TO 0.63 INCH IN DECEMBER, WITH THE WATER TABLE AT 4 FEET.





R. L. PARSHALL IS COMPILING AND ANALYZING DATA OBTAINED ON THE ADJUSTABLE TUBE METER STUDIES CONDUCTED AT FORT COLLINS LABORATORY LAST SUMMER. IT WAS EXPECTED THAT THIS METER WOULD SUCCESSFULLY MEET FIELD CONDITIONS WHERE THE LOSS OF HEAD THROUGH THE DEVICE IS RELATIVELY SMALL - THAT IS TO SAY FROM 0.03 TO 0.05 FOOT. THE DATA SEEM TO INDICATE THAT DEPENDABLE MEASUREMENTS CAN BE MADE AT THESE LIMITS, AND FOLLOWING THE TESTS MADE TO DETERMINE THE VALUE OF THE CONSTANT K IN THE FORMULA  $Q = K^{HD}$  IT WAS FOUND THAT FOR A WIDE RANGE OF DIFFERENCE IN HEAD THE DEVICE OPERATED WELL WITHIN PRACTICAL LIMITS OF ERROR. FOLLOWING THIS SERIES OF EXPERIMENTS, A STUDY OF RANDOM OBSERVATIONS WAS MADE WHICH, FOR THE MOST PART, SHOWED CONSISTENT RESULTS AND FULLY VERIFIED THE CONTENTION THAT THIS METER WILL OPERATE UNDER PRACTICAL CONDITIONS MORE SATISFACTORILY THAN ANY PRESENT KNOWN DEVICE. ARRANGEMENTS HAVE BEEN MADE TO HAVE THIS MODEL INSTALLED SOMEWHERE ALONG THE FORT LYON CANAL SYSTEM IN THE ARKANSAS VALLEY THIS COMING SEASON, FOR THE PURPOSE OF STUDYING IT UNDER PRACTICAL CONDITIONS. MR. PARSHALL PLANS TO SELECT THE MOST ADVERSE CONDITIONS TO BE FOUND FOR TESTING THE DEVICE IN ORDER THAT A COMPLETE STUDY MAY BE MADE TO DETERMINE ITS SHORTCOMINGS.

DURING JANUARY TWO CONFERENCES WERE HELD IN THE BERKELEY OFFICE, THE PURPOSE OF WHICH WAS TO CONSIDER AND ARRANGE A PROGRAM FOR A LATER GENERAL MEETING THAT IT IS EXPECTED WILL BRING TOGETHER RESEARCH WORKERS AND PRACTICAL ENGINEERS AS WELL AS CONSERVATION GROUPS DEALING WITH CONSUMPTIVE USE OF WATER IN IRRIGATION, AND WATER CONSERVATION. REPRESENTATIVES WILL BE PRESENT FROM VARIOUS OF THE WESTERN STATES AT THE GENERAL MEETING TO BE HELD IN LOS ANGELES THE LATTER PART OF MARCH.

ON JANUARY 8 FRED C. SCOBEEY GAVE AN ADDRESS, ILLUSTRATED BY LANTERN SLIDES, ON "WATER CONDUIT SURFACES IN TERMS OF CAPACITY, PARTICULARLY THE NEW AND UNUSUAL," BEFORE THE LOS ANGELES SECTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS. A FEW DAYS LATER A SIMILAR ADDRESS ON "THE FLOW OF WATER IN CONCRETE PIPE AS AFFECTED BY THE METHODS UNDER WHICH IT IS MADE AND LAID," WAS GIVEN BY HIM BEFORE THE NATIONAL CONVENTION OF THE AMERICAN CONCRETE PIPE ASSOCIATION. MR. SCOBEEY HAS JUST BEEN ELECTED CHAIRMAN OF THE EXECUTIVE COMMITTEE OF THE IRRIGATION DIVISION, AMERICAN SOCIETY OF CIVIL ENGINEERS, TO SERVE FOR TWO YEARS.

R. B. GRAY RETURNED JANUARY 18 FROM A TRIP TO ROCKFORD, ILLINOIS, AND RACINE, WISCONSIN, WHERE HE CONFERRED WITH OFFICIALS OF THE J. I. CASE AND MASSEY-HARRIS COMPANIES. ON JANUARY 25 HE RETURNED FROM BOSTON WHERE HE TALKED TO THE NEW ENGLAND FARM EQUIPMENT ASSOCIATION, ON JANUARY 22, ON MACHINERY METHODS OF CONTROLLING THE CORN BORER. WHILE THERE HE CONFERRED WITH L. H. WORTHLEY ON CORN BORER CONTROL MATTERS AND VIEWED THE BERKELEY FARM RECENTLY ACQUIRED BY THE U.S.D.A. FOR EXPERIMENTAL WORK RELATING TO THE CORN BORER. ON HIS RETURN JOURNEY HE STOPPED OFF AT SOUTH NORWALK, CONNECTICUT, AND INSPECTED THE NEW SHOP AND WAREHOUSE RECENTLY MOVED INTO BY THE PLANT QUARANTINE AND CONTROL ADMINISTRATION.







MR. GRAY ATTENDED THE CORN BORER CONFERENCE HELD IN WASHINGTON ON FEBRUARY 11.

O. K. HEDDEN LEFT JANUARY 29 FOR LANCASTER, CALIFORNIA, TO TAKE PART IN CONDUCTING TESTS WITH THE BURNER, BUILT AT TOLEDO, FOR COMBATING THE PEA APHID WHICH IS RAVAGING THE ALFALFA IN THE ANTELOPE VALLEY. EN ROUTE HE VISITED PROFESSOR H. B. WALKER AT DAVIS. ON ARRIVING AT HIS DESTINATION MR. HEDDEN ATTENDED A CONFERENCE OF ALL PARTIES INTERESTED IN PEA APHID CONTROL. THIS INCLUDED A TOUR OF INSPECTION OF A NUMBER OF INFESTED FIELDS WHERE IT WAS NOTED THAT THERE WAS CONSIDERABLE ACTIVITY AMONG THE INSECTS AND FLIGHT HAD COMMENCED.

CONSIDERABLE INTEREST HAS BEEN AROUSED IN THE PROVISIONS OF H. R. 9679 DEALING WITH THE RETIREMENT OF EMPLOYEES. THE BILL PROVIDES FOR AN ANNUITY COMPOSED OF:

(1) A SUM EQUAL TO \$30 FOR EACH YEAR OF SERVICE NOT EXCEEDING 30 TO BE CONTRIBUTED BY THE GOVERNMENT.

(2) THE AMOUNT OF AN ANNUITY PURCHASABLE WITH THE SUM TO THE CREDIT OF THE EMPLOYEE'S INDIVIDUAL ACCOUNT AT THE TIME HE RETIRES FROM THE SERVICE WHICH HAS BEEN CREATED BY DEDUCTIONS FROM HIS PAY.

IT FURTHER PROVIDES THAT AFTER JULY 1, 1930, THE SUM OF \$1.00 PER MONTH SHALL BE TAKEN FROM THE RETIREMENT DEDUCTION OF EACH EMPLOYEE TO BE PLACED IN A SPECIAL FUND. THE BALANCE WILL BE PLACED TO THE EMPLOYEE'S CREDIT IN THE CIVIL SERVICE RETIREMENT AND DISABILITY FUND AS IN THE PAST.

COMPLETE TABLES SHOWING ACTUAL WORKINGS OF THE LAW HAVE NOT BEEN DEVELOPED BUT PRELIMINARY TABLES INDICATE THAT THE RETIREMENT PAY UNDER THIS BILL WILL BE LARGER THAN UNDER ANY HERETOFORE PROPOSED.

THE BILL PROVIDES FOR RETIREMENT AT THE OPTION OF THE EMPLOYEE TWO YEARS EARLIER THAN IS NOW PERMISSIBLE, AND PROVIDES FOR THOSE EMPLOYEES WHO ARE INVOLUNTARILY REMOVED FROM SERVICE DUE TO REDUCTION OF FORCE OR FOR OTHER REASONS.

The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the laws of quantum mechanics are based on the principle of the conservation of energy.

The second part of the paper is devoted to a discussion of the application of the theory of the structure of the atom to the study of the properties of matter. It is shown that the theory of the structure of the atom can be used to explain the properties of matter, such as the properties of the elements of the periodic table, the properties of the compounds of the elements, and the properties of the solutions of the compounds of the elements.

The third part of the paper is devoted to a discussion of the application of the theory of the structure of the atom to the study of the properties of the solutions of the compounds of the elements. It is shown that the theory of the structure of the atom can be used to explain the properties of the solutions of the compounds of the elements, such as the properties of the acids, the properties of the bases, and the properties of the salts.